Highly Erodible Land

Highly erodible land is defined by the Sodbuster, Conservation Reserve, and Conservation Compliance parts of the Food Security Act of 1985 and the Food, Agriculture, Conservation, and Trade Act of 1990. Determinations for highly erodible land are based on an erodibility index as defined in the National Food Security Act Manual.

Official lists of highly erodible and potential highly erodible soil map units are maintained in the NRCS - Field Office Technical Guide. Policy and procedures for developing and maintaining the lists are given in part 511 of the National Food Security Act Manual.

Highly Erodible Soil Map Units – A soil map unit with an erodibility of 8 or greater is highly erodible land (HEL).

Calculating Erodibility Index – The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the loss tolerance (T).

Sheet and Rill Equation $\dfrac{R \times K \times LS}{T} = EI$

Soil Erodibility Factor (K)

Soils vary in their susceptibility to erosion. The soil erodibility factor K is a measure of erodibility for a standard condition. The soil erodibility factor K represents both susceptibility of soil to erosion and the amount and rate of runoff, as measured under the standard unit plot condition. Fine textured soils high in clay have low K values, about 0.02 to 0.15, because they are resistant to detachment. Coarse texture soils, such as sandy soils, have low K values, about 0.05 to 0.2, because of low runoff even though these soils are easily detached. Medium textured soils, such as silt loam soils, have moderate K values, about 0.25 to 0.40, because they are moderately susceptible to detachment and they produce moderate runoff. Soils having a high silt content are the most erodible of all soils. They are easily detached and they tend to crust and produce large amounts and rates of runoff. Values of K for these soils tend to be greater than 0.4. In the Caribbean Area, K values range from 0.02 to 0.32.

Soil Loss Tolerance (T)

It is defined as the maximum rate of annual soil erosion that will permit crop productivity to be sustained economically and indefinitely. The T factors are integer values from 1 through 5 tons per acre per year. The factor of 1 ton per acre per year is for shallow or otherwise fragile soils and 5 tons per acre per year is for deep soils that are least subject to damage by erosion. The classes of T factors are 1, 2, 3, 4, and 5.

Highly Erodible Land, (cont.)

Erosivity Factor (R)

The rainfall-runoff factor, R, can be simply defined as the erosive force of the rainfall. The erosivity of rainfall varies greatly by location. For example, erosivity in the eastern interior zone of the Caribbean Area is much higher than in the south coastal zone of the area. The R factor represents these differences in erosivity among locations. Values for R computed from weather records were used to produce the Caribbean Area data base map.

Slope Gradient Factor (S)

Slope gradient is the difference in elevation between two points and is expressed as a
percentage of the distance between those points. For example, a difference in elevation of 1 meter over a horizontal distance of 100 meters is a slope of 1 percent.

Slope gradient influences the retention and movement of water, the potential for soil slippage and accelerated erosion, the ease with which machinery can be used, soil-water states, and the engineering uses of the soil.

Slope gradient is usually measured with a hand level or clinometer. The range is determined by summarizing data from several sightings.

Enter the high, low, and representative values to represent the range of slope gradient as a percentage for the map unit component. Entries for high and low are whole number integers and range from 0 to 999.

Slope Length Factor (L)

Slope length is the horizontal distance from the origin of overland flow to the point where either the slope gradient decreases enough that deposition begins or runoff becomes concentrated in a defined channel. Reference Agriculture Handbook 703.

Slope length has considerable control over runoff and potential accelerated water erosion. Slope length is combined with slope gradient in erosion prediction equations to account for the effect of topography on erosion. Slope length is measured from the point of origin of overland flow to the point where the slope gradient decreases enough that deposition begins or runoff becomes concentrated in a defined channel. Slope length is best determined by pacing or measuring in the field.

Enter the high, low, and representative values for the range for each map unit component. Enter a whole number that represents the length in meters from the point of origin of overland flow to the point of deposition or concentrated flow of the slope on which the component lies. The slope length may be fully encompassed within one map unit or it may cross several map units. The minimum value is 0, and the maximum value used in erosion equations is 305 meters.